

TEST REPORT

Applicant: TFIVE PTY LTD
Address: 10/29 Lorne Ave Killara NSW 2071 Australia
Equipment Type: Motion Sensor P1
Model Name: MS-S02
Brand Name: Aqara
Test Standard: Radiation Protection Series No. 3: 2002
AS/NZS 2772.2: 2016
Test Date: May 27, 2022 - Jun. 07, 2022
Date of Issue: Jun. 21, 2022

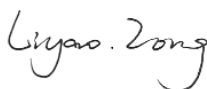
ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

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(Chief Engineer)



Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions Content</u>
<u>Rev. 01</u>	<u>Jun. 21, 2022</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1. GENERAL INFORMATION	3
1.1 Identification of the Testing Laboratory	3
1.2 Identification of the Responsible Testing Location	3
2. PRODUCT INFORMATION	4
2.1 Applicant Information.....	4
2.2 Manufacturer Information	4
2.3 Factory Information	4
2.4 General Description for Equipment under Test (EUT)	4
2.5 Ancillary Equipment.....	4
2.6 Technical Information	5
3. STANDARD INFORMATION.....	6
3.1 Test Standard.....	6
4. DEVICE CATEGORY AND LEVELS LIMITS	7
5. MPE ASSESSMENT	10
5.1 Output Power	10
5.2 Assessment Result.....	10
5.3 Conclusion.....	10

1. GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China
Description	All measurement facilities used to collect the measurement data are located at Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China

2. PRODUCT INFORMATION

2.1 Applicant Information

Applicant	TFIVE PTY LTD
Address	10/29 Lorne Ave Killara NSW 2071 Australia

2.2 Manufacturer Information

Manufacturer	Lumi United Technology Co., Ltd.
Address	Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	Motion Sensor P1
Model Name Under Test	MS-S02
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	V3
Software Version	0.0.0_0005
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	Panasonic
	Model No.	CR2450
	Serial No.	N/A
	Capacity	620 mAh
	Rated Voltage	3.0 V
	Limit Charge Voltage	N/A

2.6 Technical Information

Network and Wireless connectivity	ZigBee
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The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	ZigBee	
Operating Frequency	ZigBee	2405 ~ 2480 MHz
Antenna Type	ZigBee	PCB Antenna
Exposure Category	General Population/Uncontrolled Exposure	
EUT Stage	Fixed Device	

3. STANDARD INFORMATION

3.1 Test Standard

No.	Identity	Document Title
1	Radiation Protection Series No. 3: 2002	Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields - 3 kHz to 300 GHz
2	AS/NZS 2772.2:2016	Radiofrequency fields - Part 2: Principles and methods of measurement and computation - 3 kHz to 300 GHz

4. DEVICE CATEGORY AND LEVELS LIMITS

The field calculation does not take into account the antenna size, which is assumed to be a point source. An ideal isotropic antenna is used as a reference to compare the performance of practical antennas: P watts is radiated, from a point, uniformly over the surface of sphere of radius r . The POINTING VECTOR gives the power density:

Assumed use distance from EUT to Human, **20 cm** separation distance warning is required. In this section, the power density at 20 cm location is calculated to examine if it is lower than the limit.

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = power density

P = output power (W)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Separation distance between radiator and human body (m)

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the following limits.

Compliance criteria

The worst case maximum exposure levels (Non Occupational) are given in Table 7 of the ARPANSA standard as shown below. The limits are given as Reference Levels which vary with the frequency. The General Public exposure category is applicable for this report.

ARPANSA Standard, Table 7: Reference Levels for the Time Averaged Exposure to RMS Electric and Magnetic Fields

Exposure Category	Frequency range	E-Field strength (V/m rms)	H-field strength (A/m rms)	Equivalent plane wave power flux density Seq (W/m ²)
Occupational	100 kHz – 1 MHz	614	1.63 / f	—
	1 MHz – 10 MHz	614 / f	1.63 / f	1000 / f (see note 5)
	10 MHz – 400 MHz	61.4	0.163	10 (see note 5)
	400 MHz – 2 GHz	$3.07 \times f^{0.5}$	$0.00814 \times f^{0.5}$	f / 40
	2 GHz – 300 GHz	137	0.364	50
General Public	100 kHz – 150 kHz	86.8	4.86	—
	150 kHz – 1 MHz	86.8	0.729 / f	—
	1 MHz – 10 MHz	$86.8 / f^{0.5}$	0.729 / f	—
	10 MHz – 400 MHz	27.4	0.0729	2 (see note 6)
	400 MHz – 2 GHz	$1.37 \times f^{0.5}$	$0.00364 \times f^{0.5}$	f / 200
	2 GHz – 300 GHz	61.4	0.163	10

Note:

1. f is the frequency in MHz.
2. For frequencies between 100 kHz and 10 GHz, S_{eq} , E^2 and H^2 must be averaged over any 6 minute period.
3. For frequencies exceeding 10 GHz, S_{eq} , E^2 and H^2 must be averaged over any $9.6 \times 10^4 / f$ 1.05 minute period (see note 1).
4. Spatial averaging of the time averaged reference levels of Table 7 should be performed according to the requirements of clause 2.7.
5. For occupational exposure, E and H reference levels of Table 7 are given in plane wave ratio at frequencies greater than or equal to 1 MHz. However, for many occupational exposure situations, equivalent plane wave power flux density is not an appropriate metric if 'far-field' exposure conditions do not apply. Survey meters may be calibrated in terms of W/m², but both E and H will generally require independent measurement and evaluation if measured in the near-field.
6. For general public exposure E and H reference levels of Table 7 are given in plane wave ratio at frequencies greater than or equal to 10 MHz. However, equivalent plane wave power flux density is not an appropriate metric if 'far-field' exposure conditions do not apply. Survey meters may be calibrated in terms of W/m², but both E and H will generally require independent measurement and evaluation if measured in the near-field.

5. MPE ASSESSMENT

5.1 Output Power

ZigBee			
Mode	O-QPSK		
	Low	Middle	High
EIRP (dBm)	8.8	8.7	8.7
Note: This report listed the worst case EIRP power value, please refer to RF test report for more details.			

5.2 Assessment Result

Mode	Max. EIRP (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (W/m ²)	Limit of Power Density (W/m ²)	Verdict
ZigBee	8.8	0.5	20	0.015	10	Pass

5.3 Conclusion

This EUT is deemed to comply with the reference level limits by Council Recommendation Radiation Protection Series No. 3: 2002 therefore the basic restrictions are compliant with human exposure limits.

Statement

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
2. The report without China inspection body and laboratory Mandatory Approval (CMA) mark has no effect of proving to the society.
3. For the report with CNAS mark or A2LA mark, the items marked with "☆" are not within the accredited scope.
4. This report is invalid if it is altered, without the signature of the testing and approval personnel, or without the "inspection and testing dedicated stamp" or test report stamp.
5. The test data and results are only valid for the tested samples provided by the customer.
6. This report shall not be partially reproduced without the written permission of the laboratory.
7. Any objection shall be raised to the laboratory within 30 days after receiving the report.

--END OF REPORT--